

REMARKS

Applicants thank the Examiner for the thorough examination of the application.

Claims 1, 3-10, 12, 13, 15-18 and 21-25 are pending in this application. Claims 1, 10 and 25 are independent.

Reconsideration of the present application is respectfully requested.

Claim Objections

Claims 1 and 10 stand objected to for reciting "signal to a pixel electrode" in two locations. The Office Action alleges that this is incorrect because "[O]nly one signal is applied to the pixel electrode, and it is applied by the source or drain of the transistor."

Applicants respectfully disagree with this allegation. Applicants apply a data signal to the pixel electrode - see page 6 of Applicants' specification, which clearly discloses "a data signal is applied to the pixel electrode" (lines 15 and 16), for example, and Applicants apply a voltage signal to the pixel electrode via the gate line due to the fact that the gate dummy pattern defines a second storage capacitor along with the pixel electrode and, as a result, a capacitance value of the second storage capacitor caused by the gate dummy pattern is added to the existing storage capacitor so that a voltage at the pixel electrode can remain more stable (paragraph bridging pages 7 and 8 of Applicants' specification).

Accordingly, withdrawal of this objection is respectfully requested.

Rejection under 35 U.S.C. §103(a)

Claims 1, 3, 5, 6, 8, 10, 12, 15, 17 and 21-24 are rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,429,909 to Kim et al. (Kim) in view of U.S. Patent No. 6,313,889 to Song et al (Song). This rejection is respectfully traversed.

Because the rejection is based on 35 U.S.C. §103, what is in issue in such a rejection is "the invention as a whole," not just a few features of the claimed invention. Under 35 U.S.C. §103, "[a] patent may not be obtained . . . if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains." The determination under section 103 is whether the claimed invention as a whole would have been obvious to a person of ordinary skill in the art at the time the invention was made. See In re O'Farrell, 853 F.2d 894, 902, 7 USPQ2d 1673, 1680 (Fed. Cir. 1988). In determining obviousness, the Examiner must explain what the differences between the claimed invention and the prior art are and provide objective factual evidence to support a conclusion that it would be obvious to one of ordinary skill in the art to achieve the claimed invention, which includes those missing features.

Furthermore, in rejecting claims under 35 U.S.C. §103, it is incumbent on the Examiner to establish a factual basis to support the legal conclusion of obviousness. See, In re Fine, 837 F.2d 1071, 1073, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988). In so doing, the Examiner is expected to make the factual determinations set forth in Graham v. John Deere Co., 383 U.S. 1, 17, 148 USPQ 459, 467 (1966), and to provide a reason why one of ordinary skill in the pertinent art would have been led to modify the prior art or to combine prior art references to arrive at the claimed invention. Such reason must stem from some teaching, suggestion or implication in the prior art as a whole or knowledge generally available to one having ordinary skill in the art. Uniroyal Inc. v. F-Wiley Corp., 837 F.2d 1044, 1051, 5 USPQ2d 1434, 1438 (Fed. Cir. 1988), cert. denied, 488 U.S. 825 (1988); Ashland Oil, Inc. v. Delta Resins & Refractories, Inc., 776 F.2d 281, 293, 227 USPQ 657, 664 (Fed. Cir. 1985), cert. denied, 475 U.S. 1017 (1986); ACS Hospital Systems, Inc. v. Montefiore Hospital, 732 F.2d 1572, 1577, 221 USPQ 929, 933 (Fed. Cir. 1984). These showings by the Examiner are an essential part of complying with the burden of presenting a *prima facie* case of obviousness. Note, In re Oetiker, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992). The mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification. In re Fritch, 972 F.2d 1260, 1266, 23 USPQ2d 1780, 1783-84 (Fed. Cir. 1992). To establish *prima facie* obviousness of a claimed

invention, all the claim limitations must be suggested or taught by the prior art. In re Royka, 490 F.2d 981, 180 USPQ 580 (CCPA 1970). All words in a claim must be considered in judging the patentability of that claim against the prior art. In re Wilson, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970).

Moreover, a showing of a suggestion, teaching, or motivation to combine the prior art references is an "essential evidentiary component of an obviousness holding." C.R. Bard, Inc. v. M3 Sys. Inc., 157 F.3d 1340, 1352, 48 USPQ2d 1225, 1232 (Fed. Cir. 1998). This showing must be clear and particular, and broad conclusory statements about the teaching of multiple references, standing alone, are not "evidence." See In re Dembiczak, 175 F.3d 994 at 1000, 50 USPQ2d 1614 at 1617 (Fed. Cir. 1999).

Kim discloses an LCD in which repair lines which are used as substitutes for open-line data lines, are separately formed on either side of the gate lines and on the same layer as the gate lines. In Kim, the repair lines are used only by being connected to open data lines, and are used only to repair the broken (open circuit) data lines by connection, not by disconnection.

Moreover, contrary to the assertions in the Office Action, Kim does not disclose a gate dummy pattern. Rather, Kim discloses repair lines for data lines. Kim's repair lines are not disclosed to be gate lines nor are Kim's repair lines disclosed to be connected with gate lines. Kim's repair lines are only disclosed to be connected with data lines.

Song is directed to an LCD having a layout designed to repair defects such as (1) disconnection of display signal lines and scanning signal lines, (2) shorting of the pixel electrode and the signal line, and (3) loss of the electrode of a switching element. See the Abstract of Song.

Instead of using a prior art repair line RL that crosses a plurality of scanning lines (Fig. 5 of Song), Song uses left and right auxiliary scanning lines connecting upper and lower first signal lines to form left and right boundaries of each pixel region (paragraph bridging cols. 5 and 6 of Song), a second signal line stretching in a vertical direction crossing upper and lower first signal lines, a plurality of connect means connecting various upper and lower signal lines and auxiliary signal lines. Moreover (col. 6, lines 45-49), Song prefers that its auxiliary signal lines are connected to the upper first signal line or the lower first signal line, and the upper and lower first signal lines and the auxiliary signal lines are used as a capacitance electrode.

In other words, Song has a decidedly more complex and different LCD matrix circuit layout than does Kim.

In one embodiment of Song (Figs. 19A and 19B), relied on in the Office Action, Song repairs a specific defect, i.e., where "the data line D placed between a diverging point of the contact portion 21 in a pixel PX1 and a diverging point of the source electrode 7 of a pixel PX2 which is formed below the pixel PX1 is disconnected (a) so that a data signal cannot be transferred to a portion following

the disconnected point. Here, the arrows shown in Figs. 19A and 19B represent the flow of the signal.” (col. 16, lines 1-8).

The repair relied on in the Office Action is discussed in col. 17, starting in line 4. The repair includes respectively shorting (c and d) the drain electrode 8 and the gate electrode 2, and the gate electrode 2 and the source electrode 7 and the two parts of the upper gate line of the pixel PX2, above and below the gate electrode 2, are disconnected (e and j). As a result, the data signal comes to flow along the data line again.

Based on these teachings of Kim and Song, the Office Action concludes that it would have been obvious “to modify Kim with the redundancy electrodes for electrically connecting the gate line to the broken data line per Song.”

Applicants respectfully disagree with this conclusion for a number of reasons.

In the first place, the Office Action provides no objective factual evidence to support a conclusion that one of ordinary skill in the art would be motivated to modify Kim’s simple LCD matrix circuit to make it more complex by adding multiple, upper and lower, auxiliary signal lines and connect lines just to repair data lines when Kim has a far less complex and far simpler data line repair mechanism in place that has no disclosed need to be improved upon.

In the second place, not only is the relied upon (in Song) repair structure far more complex than Kim’s, but Song’s repair technique is far more complex than is

Kim's. In Kim, if, for example, data line 400 is not connected to repair lines 110 and 120, the repair lines 110 and 120 are simply shorted to the data line 400 by laser irradiation. On the other hand, in Song, as discussed above, one must not only make two shorts (c and d), but also two disconnects (e and j) to repair the data line.

Applicants respectfully submit that one of ordinary skill in the art would have no proper motivation to add the aforementioned structural and procedural complexity to Kim to achieve what Kim achieves with a far simpler structure and procedure. In fact, this added structural and procedural complexity is objective factual evidence that one of ordinary skill in the art would have a disincentive to achieve the proposed modification of Kim in view of Song.

Applicants respectfully submit that the inferences one of ordinary skill in the art would draw from Kim and Song include the disincentive to modify Kim by making Kim more structurally complex in order to achieve what Kim does with a far simpler structure, and the disincentive to require a more complicated and, presumably, more time consuming procedure to repair data lines.

A reference may be said to teach away when a person of ordinary skill, upon reading the reference, would be discouraged from following the path set out in the reference, or would be led in a direction divergent from the path that was taken by the applicant. See W.L. Gore & Assoc., Inc. v. Garlock, Inc., 721 F.2d

1540, 1550-51, 220 USPQ 303, 311 (Fed. Cir. 1983) (the totality of a reference's teachings must be considered), cert. denied, 469 U.S. 851 (1984).

Moreover, the statement in the sentence bridging pages 5 and 6 of the Office Action, i.e., that "[S]ong is evidence that ordinary workers in the art of liquid crystals would find the reason, suggestion or motivation to form the gate dummy pattern in such a manner as to serve as a redundancy electrode for electrically connecting the gate line to the broken line to effect repairs" is nothing more than a broad general conclusion that does not constitute evidence of proper motivation to fundamentally redesign and make more complex a simple data line repair structure and procedure like that of Kim that does not require connecting a gate line to a data line.

Accordingly, the Office Action does not make out a *prima facie* case of proper motivation to modify Kim as suggested and, thus, does not make out a *prima facie* case of obviousness of the invention recited in independent claims 1 and 10.

Moreover, because dependent claims 3, 5, 6, 8, 21 and 22 depend from claim 1, and claims 12, 15, 17, 23 and 24 depend from claim 10, claims 3, 5, 6, 8, 12, 15, 17 and 21-24 are not obvious at least for the reasons that claims 1 and 10 are not obvious, as stated above.

Reconsideration and withdrawal of this rejection of claims 1, 3, 5, 6, 8, 10, 12, 15, 17 and 21-24 under 35 U.S.C. §103(a) is respectfully requested.

Claim 25 stands rejected under 35 U.S.C. §103(a) as unpatentable over Kim in view of Song, as applied in the rejection traversed above, and further in view of U.S. Patent 5,657,101 to Cheng. This rejection is respectfully traversed.

In the first place, the Kim-Song reference combination is improper for the reasons stated above. Moreover, Cheng is not applied to remedy the aforementioned deficiencies in the Kim-Song reference combination. Accordingly, this rejection is improper and should be withdrawn.

The Office Action admits that Kim in view of Song does not disclose gate dummy patterns on both sides of a data line.

To remedy this deficiency, the Office Action turns to Cheng. In Fig. 5, Cheng discloses storage electrodes 52 slightly separated from data lines 59 and storage electrodes 56 slightly separated from scan lines 40 (col. 4, lines 26-44).

The Office Action alleges that Cheng is evidence of motivation to add gate dummy patterns on both sides of the data line to improve the aperture ratio.

Applicants do not understand why one of ordinary skill in the art would turn to Cheng to improve Kim's aperture ratio because Kim already discloses techniques to improve the aperture ratio and demonstrate no need to have its aperture ratio improved in general, or by rearranging their circuit patterns. Moreover, Cheng does not disclose its storage electrodes to be dummy gate lines. In fact, Cheng discloses locating its storage electrodes to avoid co-planar shorts, and not to be used as dummy gate lines in any way.

Applicants respectfully submit that one of ordinary skill in the art would have no incentive to look to Cheng for any reason to modify Kim and Song, let alone to redesign Kim-Song to provide dummy gate lines when there is no incentive to provide dummy gate lines in Kim in view of Song, for the reasons discussed above.

Applicants respectfully submit that this rejection is wholly based on improper hindsight reconstruction of Applicants' invention based solely on Applicants' disclosure.

Reconsideration and withdrawal of this rejection of claim 25 under 35 U.S.C. §103(a) is respectfully requested.

Claims 4, 7, 9, 13, 16 and 18 stand rejected under 35 U.S.C. §103(a) as unpatentable over Kim in view of Song, as applied in the rejections traversed above, and further in view of U.S. Patent 5,734,450 to Irie et al. (Irie). This rejection is respectfully traversed.

In the first place, the Kim-Song reference combination is improper for the reasons stated above. Moreover, Irie is not applied to remedy the aforementioned deficiencies in the Kim-Song reference combination. Accordingly, this rejection is improper and should be withdrawn.

Claims 4, 7, 9, 13, 16 and 18 recite a combination of features wherein the gate dummy pattern includes a recess to permit repair to be made by disconnection of the dummy pattern from the gate line.

Applicants respectfully submit that one of ordinary skill in the art would not have any incentive to provide such a recess because one of ordinary skill in the art would not have the incentive to provide for disconnection of repair lines in Kim which only discloses connecting a repair line, not disconnecting a repair line.

Further, Applicants cannot find where Irie discloses a recess (or hole) as recited to disconnect a line. The quoted (in the rejection) "narrow part 44," which is shown in Fig. 2, is just a narrow portion of the gate electrode 41 between the gate electrode 41 and gate line 1. In no sense is it a hole or recess, as recited.

So, even if the improper Kim-Song reference combination were modified in view of Irie, the resulting reference combination would not have a recess, as recited.

Further, with respect to claims 7 and 16, because the combined references do not render obvious the claimed recess, they do not render obvious providing a protrusion to cover the non-existent recess. Moreover, the Office Action fails to explain how, if a protrusion covers a recess, one of ordinary skill in the art uncovers the recess to make the recited disconnection. It appears to Applicants that the proposed rejection achieves an inoperative device for the intended purpose of disconnecting a line. In this regard, Applicants direct the Examiner's

attention to In re Sponnoble, 405 F.2d 578, 587, 160 USPQ 237, 244 (CCPA 1969), which indicates that references taken in combination teach away when they would produce a "seemingly inoperative device."

Accordingly, this rejection of claims 4, 7, 9, 13, 16 and 18 under 35 U.S.C. §103(a) is improper and should be withdrawn.

CONCLUSION

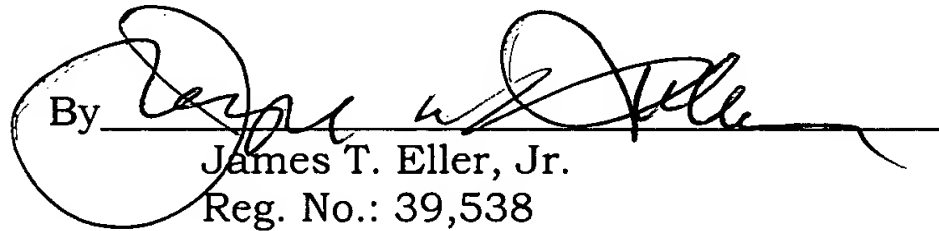
All of the stated grounds of rejection have been properly traversed, accommodated, or rendered moot. It is believed that a full and complete response has been made to the outstanding Office Action, and that the present application is in condition for allowance.


However, if there are any outstanding issues, the Examiner is invited to telephone Robert J. Webster (Reg. No. 46,472) at (703) 205-8000 in an effort to expedite prosecution.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or to credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17, particularly extension of time fees.

Respectfully submitted,

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